

RESEARCH DEPARTMENT

TRANSMITTING AERIALS FOR THE BARNSTAPLE V.H.F. TELEVISION AND
V.H.F. SOUND STATION

Technological Report No. E-117/8
UDC 621.396.712 1966/60

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for Head of Research Department

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INTRODUCTION

The Barnstaple relay station came into operation on the 16th May, 1966. It provides a television and v.h.f. sound service to Barnstaple, Bideford and most of the intervening area including the following towns and villages: Braunton, Bishops Tawnton, Fremington, Northam, Appledore and Westward Ho.

SUMMARY OF INSTALLATION

<u>Site:</u>	The site is at Huish Moor, approximately 5.7 km north-east of Bideford and 7.3 km south-west of Barnstaple, grid reference SS 502290, height 115.8 m a.m.s.l.		
<u>Support Structure:</u>	The support structure consists of a 42.7 m (140 ft) square section self-supporting tower oriented with one side on a bearing of 17.5° ETN. The tower has a 0.91 m (3 ft) side dimension above the 30.5 m (100 ft) level and is screened on all sides by horizontal 25.4 mm (1 in) diameter rods spaced 0.31 m (12 in) apart over this section.		
<u>General Arrangement:</u>	See Fig. 1.		
<u>Band I</u>			
<u>Channel:</u>	Channel 3, with horizontal polarization is used.		
<u>Aerial:</u>	The aerial ¹ consists of two tiers each of two horizontal $\lambda/2$ dipoles spaced 1.78 m (5 ft 10 in) from the tower axis and oriented on bearings 27° and 267° ETN. The dipoles are fed with equal co-phased currents. The inter-tier spacing is 0.7λ and the mean aerial height 38.1 m (125 ft) a.g.l. There are independent main feeders to each tier.		
<u>Power:</u>	A single 100 watt translator amplifier is used.		
<u>Templet and horizontal radiation pattern (h.r.p.):</u>	See Fig. 2 and Note 1.		
<u>Gain:</u>	Mean intrinsic gain		1.9 dB
	<u>Deduct:</u> loss due to distribution feeder and possible misalignment		<u>0.2 dB</u>
	Mean net gain		1.7 dB
	<u>Deduct:</u> loss due to main feeder type PT 98	1.0 dB	
	Network loss	<u>0.6 dB</u>	<u>1.6 dB</u>
	Mean effective gain		<u>0.1 dB</u>

Band II

Carrier frequencies:

88.5 (Light), 90.7 (Third) and 92.9 (Home) MHz.

Aerial:

The aerial¹ consists of two tiers, each of two horizontal $\lambda/2$ dipoles spaced 1.35 m (4 ft 5 in) from the tower axis, and oriented on bearings 30° and 240° ETN. The dipoles are fed with equal co-phased currents. The inter-tier spacing is 0.5λ and the mean aerial height 32.7 m (107 ft 3 in). There are independent main feeders to each tier.

Power:

A single 100 watt translator amplifier is used for each programme.

Templet and h.r.p:

See Fig. 3 and Note 2.

Gain:

Mean intrinsic gain	0.8 dB
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<u>Deduct:</u> loss due to distribution feeder and possible misalignment	0.2 dB
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Mean net gain	0.6 dB
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<u>Deduct:</u> loss due to main feeder type PT 98	1.2 dB
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Network loss	0.9 dB	2.1 dB
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Mean effective gain	-1.5 dB
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Programme Sources:

Both television and sound programmes are obtained by direct pick up of the transmissions from Wenvoe.

Notes:

1. The design of the Band I aerial was based on the theoretical h.r.p. derived from an equivalent cylinder for the square-section tower. This approximation gives reasonable accuracy since the tower cross-section is relatively small (0.173λ square).
2. The h.r.p. of the Band II aerial was obtained from small scale model measurements.

REFERENCE

1. Detailed information on the construction and dimensions of the aerals is given on the following drawings held by BBC Transmitter Planning and Installation Department:

P.I.D. 2059.2.3A	General Arrangement of Aerials on Tower
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P.I.D. 9820.2.6A1	Transmitting Dipole Assemblies
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P.I.D. 9820.2.10A1	Receiving Yagis
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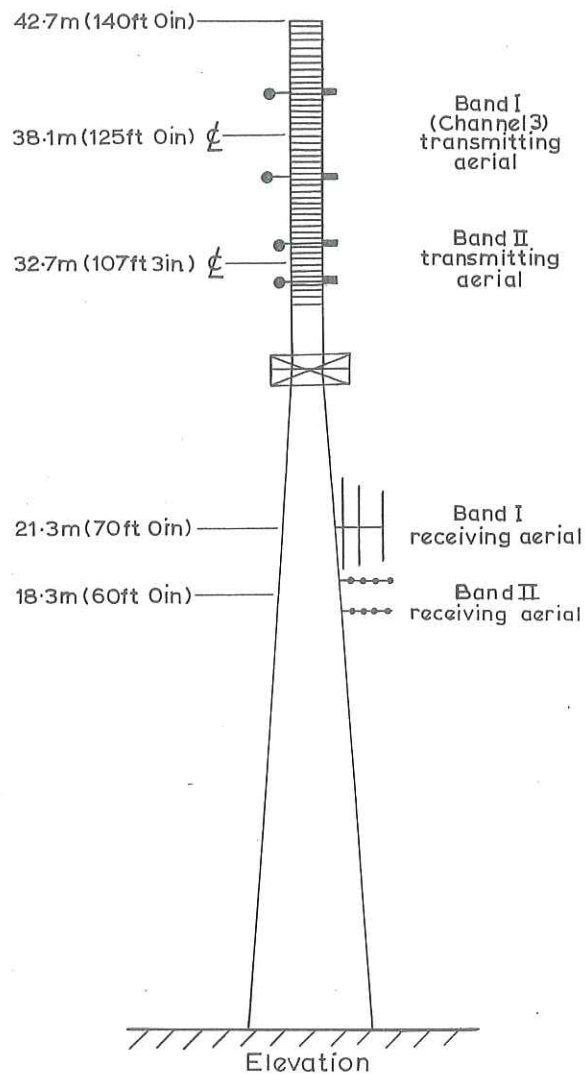
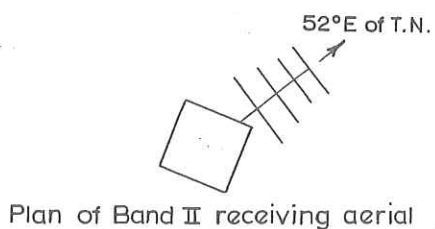
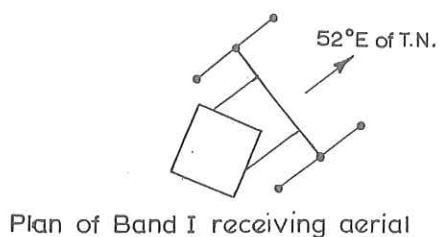
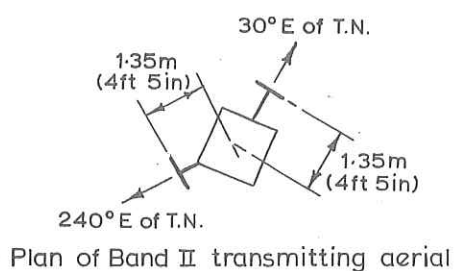
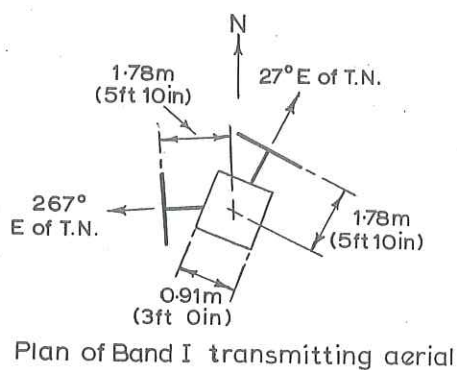


Fig.1. General arrangement of aerials on tower

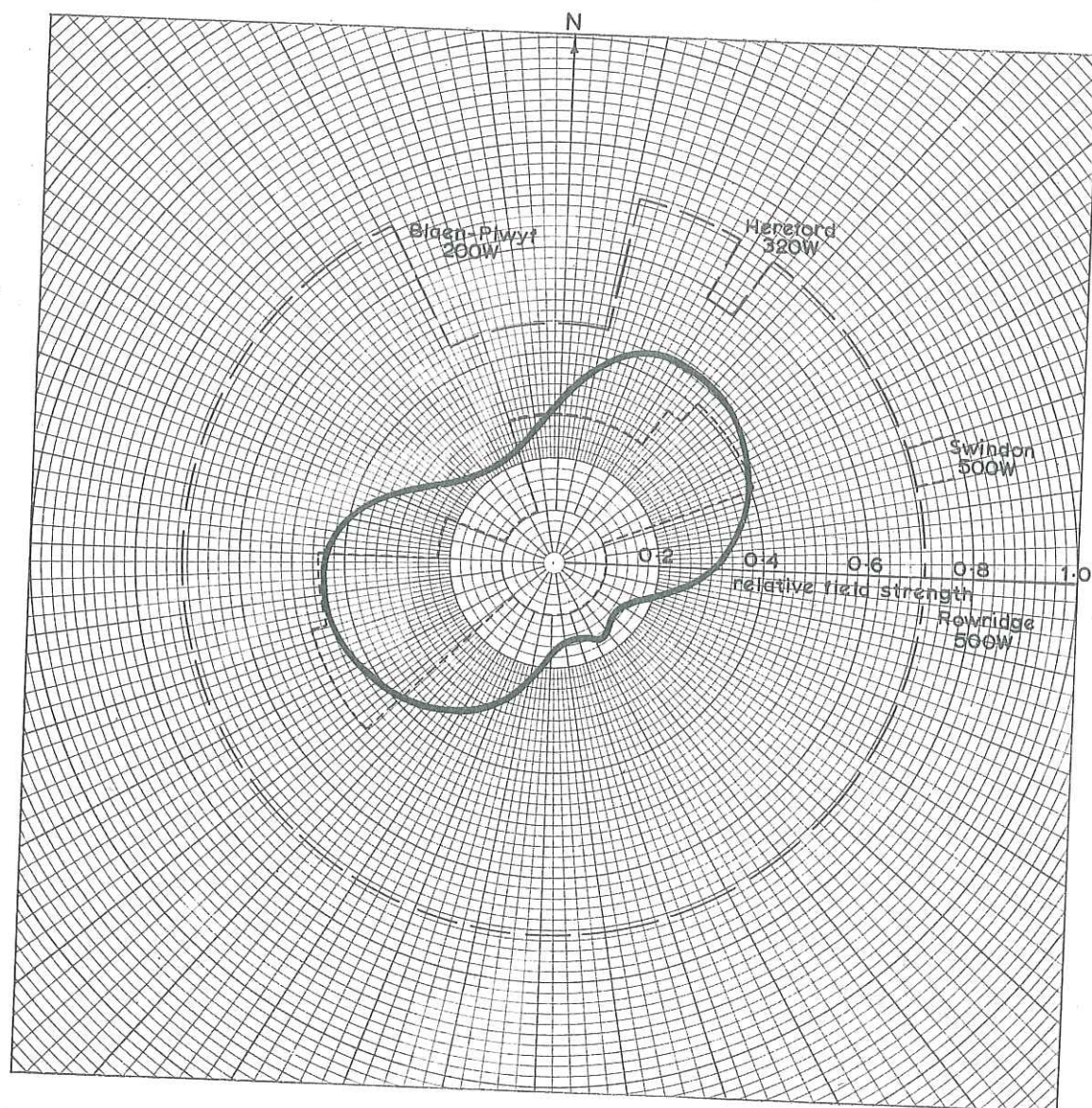


Fig.2. Band I templet and horizontal radiation pattern
HORIZONTAL POLARIZATION

Channel 3 (Vision carrier: 56.75MHz, Sound carrier: 53.25MHz)
 Mean effective gain: 0.1dB
 Transmitter power: 100W
 Mean E.R.P.: 102W

————— Maximum permissible E.R.P.
 - - - - - Minimum desirable E.R.P.

Unit field corresponds to an E.R.P. of 1kW

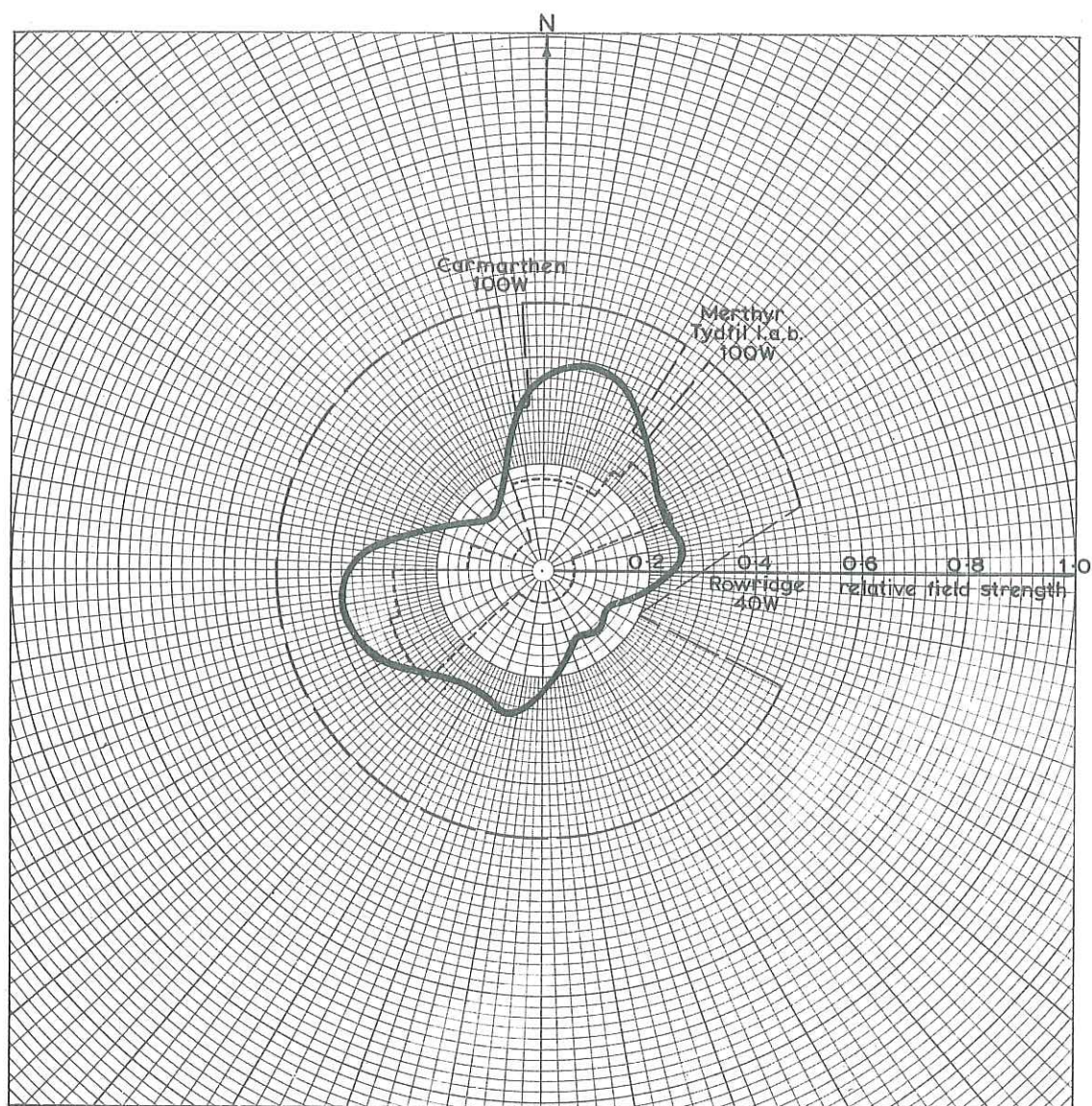


Fig.3. Band II templet and horizontal radiation pattern

HORIZONTAL POLARIZATION

88.5 (Light), 90.7 (Home), 92.9 (Third), MHz

Mean effective gain: -1.5dB

Transmitter power: 100W

Mean E.R.P. : 71W

——— Maximum permissible E.R.P.
----- Minimum desirable E.R.P.

Unit field corresponds to an E.R.P. of 1kW